

*RACER 2003*  
*How It Is Used by USACE For*  
*Estimating Environmental*  
*Remediation Projects*

U. S. Army Corps of Engineers

HTRW-CX  
June 2003 Tri-Services Cost  
Conference

# Presentation Overview

- ❏ What is *RACER*?
- ❏ *RACER* Development History
- ❏ *RACER* Use in Cost Estimating
- ❏ *RACER* User Profile
- ❏ Summary of *RACER* 2003 System Enhancements
- ❏ *RACER* Training
- ❏ *RACER* 2003 Cost Estimating Process Overview
- ❏ Future *RACER* Development
- ❏ How to Obtain *RACER* 2003

# What is *RACER*?

*RACER* (Remedial Action Cost Engineering and Requirements) is an automated, parametric cost estimating tool that can be used to estimate costs for all phases of environmental remediation including:

- Studies
- Remedial Design
- Interim Action
- Remedial Action
- Operations and Maintenance
- Long Term Monitoring
- Site Close-out
- Site Work

# *RACER* Development History

- System originally developed in 1991 under Air Force funding; Several releases occurred between 1991 - 1996
- Talisman Partners entered into a partnership with the Air Force to upgrade the software starting in 1997
- New System Design and Upgrading occurred in 1997 and 1998
- Talisman acquired by Earth Tech in 2002
- Earth Tech issued 2002 and 2003 releases

# *RACER* Development History

- New System development and upgrading occurs continually as funding allows
- *RACER* Technical Review Group, consisting of government, consultant, and industry users, provided comments, direction, and review
- *RACER* Government Steering Committee approve upgrades
- System upgrades will occur annually in October

# *RACER* Use in Cost Estimating

- *RACER* provides the detail of a definitive estimate, but can also be used at the order-of-magnitude stage of cost estimating
- *RACER* provides the accuracy of a manual estimate, but faster, less error prone, and much more efficient in comparing alternatives

# *RACER* Use in Cost Estimating

- *Army IRP*
- *FUDS*
- *Superfund*
- *DOE*
- *Others*

# *RACER* Use in Cost Estimating

- USACE develops budget estimates for Formerly Used Defense Sites Program in the Report for Congress using *RACER*
  - ◆ Very little information available on sites, therefore “Wizard” provides consistency
  - ◆ *RACER* accommodates estimating for all the phases and categories the Department of Defense has mandated
  - ◆ Estimates are prepared for each site by the Districts and reviewed by the HTRW-CX



# *RACER* Use in Cost Estimating

- Consistent approach
- Accepted by audit agencies
- Allows users to develop detailed estimates based on minimum design information
- Significant user base across Federal Government
- Accepted by regulatory and other public agencies
- Software provides significant flexibility for tailoring by individual user; design allows easy updating and enhancements

# *RACER* Use in Cost Estimating

- Scope is documented
- Ability to easily explore alternatives
- Key cost drivers identified
- A comprehensive baseline is established
- Provides a means of communicating the project costs
- Estimate can be easily updated

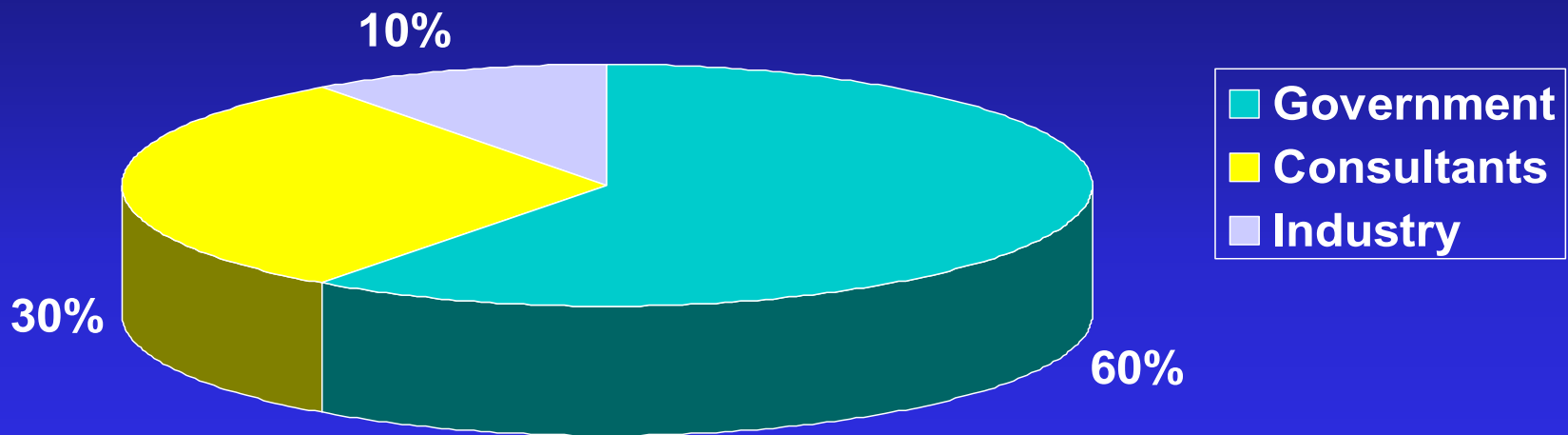
# *RACER* Use in Cost Estimating

- Comprehensive help features engineering information, system operating instructions, and technology applications and limitations
- System is annually updated with more remediation technologies and revised price data
- Cost estimates are location-specific and include general conditions, overhead and profit

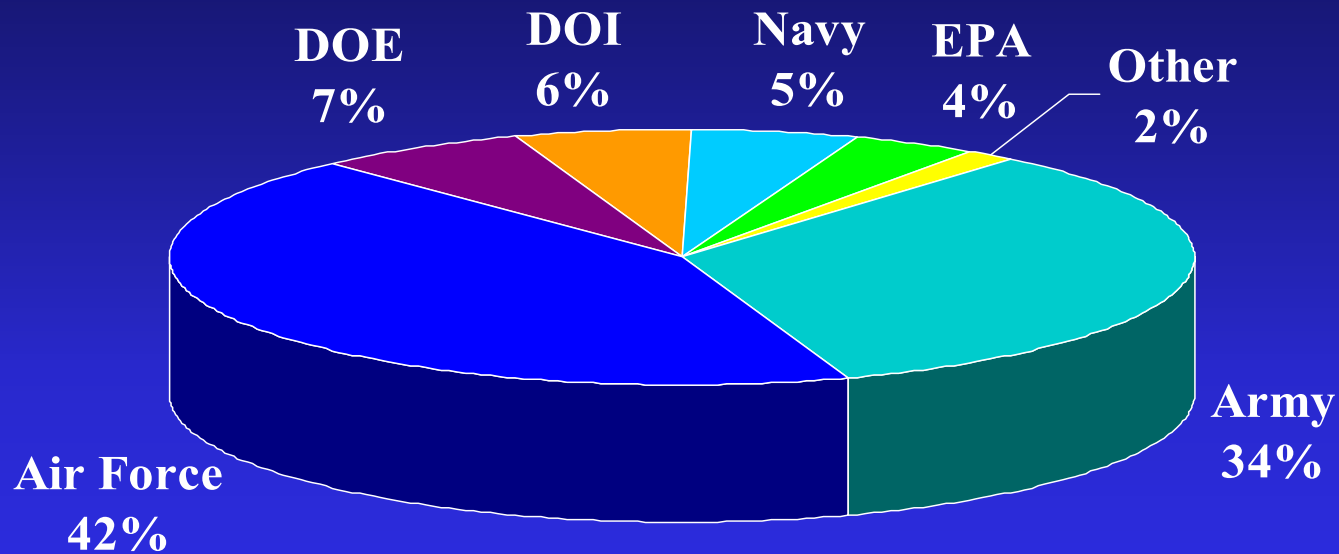
# Comments by Users on Why They Like to Use *RACER*

- Relatively easy to use
- Provides detailed logic and allows the estimator to make a complete estimate without requiring detailed knowledge of a project
- Provides significant flexibility to tailor the system to unique program/MACOM/installation requirements
- Requires much less time to make an estimate versus manual methods
- Provides tips and checks to make sure users don't "forget" cost elements

# *RACER* User Profile



# *RACER* Federal Government User Profile



Total Federal Government Users = 725

# Summary of *RACER* 2003 System Enhancements

- No Markup Preference - allows users to view reports of direct costs
- Technical Drawings for 14 Treatment technologies in the RACER Help System
- Tab Notes - allows users to enter comments or notes for each tab of each RACER technology
- Template Updater - allows user to remove unused markup, labor, analytical, and professional templates from RACER database

# Summary of *RACER* 2003 System Enhancements (Continued)

- Update RACER Database Utility – allows user to update previous 2001 or 2002 RACER estimate costs to the 2003 version costs
- New Conversion Calculator – allows user to select this feature from the RACER Help dropdown menu to convert area, volume, metric, speed, temperature, time and density
- Sorting – allows the user to sort the tree display on the left side of the main RACER screen at Level 1 by Project ID or Name



# Summary of *RACER* 2003 System Enhancements (Continued)

- Bioslurping Model – New Treatment model based on the SVE and Bioventing models. Utilizes elements of both bioventing and free product recovery
- Ordnance and Explosive Sifting Model – allows the user to estimate the cost of an OE sifting project
- User now has the option of running reports without escalation
- Interim and Remedial Action Wizard – updated to incorporate both primary and secondary media and contaminants

# RACER FY03 Cost to Complete Training

## HQ USACE Policy for Developing CTC Estimates

### Requirements for Training in Preparation of CTC Estimates:

- The DERP Management Guidance, September 2001
  - ◆ USACE must implement a formal training program
- The FUDS draft ER 200-3-1, FUDS Program Policy (published end of FY 03)
  - ◆ Chapter 6, Planning, Programming, Budgeting, Executing and Reporting
  - ◆ Appendix E, Project Cost to Complete estimating Guidance

# RACER FY03 Cost to Complete Training

- Conducted 3 FUDS Training Classes at Earth Tech offices in Denver – Feb/Mar 2003
- Over 25 persons trained
- About 80 persons trained the last 3 years
- FY 04 Training – TBD based on survey of needs later this year (3 Sessions Likely)
- Air Force conducts a number of classes each year

*RACER 2003*

# Cost Estimating Process Overview

# RACER Environmental Cost Models

Preliminary Assessment

Site Inspection

Remedial Investigation

Feasibility Study

RCRA Facility Investigation

Corrective Measures Study

Remedial Design

Administrative Record

Advanced Oxidation

Air Sparged Hydro Cyclone

Air Sparging

Air Stripping

Archive Search Reports

Asbestos Removal

Bioslurping

Bioventing

Bulk Material Storage

Capping

Carbon Adsorption (Gas)

Carbon Adsorption (Liquid)

Coagulation/Flocculation

Contaminated Building

Materials

D&D Sampling and Analysis

Decontamination Facilities

Dewatering (Sludge)

Discharge to POTW

Drum Removal

Ex Situ Bioreactors

Ex Situ Land Farming

Ex Situ Solidification/

Stabilization

Ex Situ Vapor Extraction

Excavation

Final Status Survey

Five Year Review

Documentation

Free Product Removal

French Drain

Groundwater Extraction Wells

Groundwater Monitoring Wells

Heat Enhanced Vapor

Extraction

In Situ Biodegradation

In Situ Landfarming

In Situ Solidification

In Situ Vitrification

Infiltration Gallery

Injection Wells

L L Radioactive Soil Treatment

Media Filtration

Misc. Field Installation (NEW)

Metals Precipitation

Miscellaneous Field Installation

Monitoring

Natural Attenuation

Neutralization

Off Site Trans and Landfill

Disposal

Off Site Trans and Thermal

Treatment

Oil/Water Separation

On-Site Incineration

On-Site Low Temperature Thermal

Desorption

Ordinance and Explosive

Institutional Controls

Ordinance and Explosive Monit

Ordinance and Explosive Sifting

# RACER Environmental Cost Models

- Ordnance and Explosive Site Charact and Removal Assmt
- Ordnance and Explosive Removal Action
- Operations and Maintenance
- Passive Water Treatment
- Per Diem Rates
- Permeable Barriers
- Phytoremediation
- Professional Labor Management
- Residual Waste Management
- Slurry Wall
- Soil Flushing
- Soil Vapor Extraction
- Soil Washing
- Solvent Extraction
- Special Well Drilling
- Storage Tank Installation
- Thermal/Catalytic Oxidation
- Transportation
- Trenching/Piping
- UST Closure
- UXO Active Range Clearance Planning
- UXO Active Target Clearance
- UXO Scrap Removal

# Level 1 (Project) Setup

RACER - Racer SAJ By Dist FY05.mdb

File Reports... Help

Display Option: Name

RACER

- Project for Template Holder
- SAJ
  - AF PLANT NO 74
  - BUSHNELL ARMY AIRFIELD
  - CARLSTROM FIELD
  - DELAND NAV TRG CTR
  - ELLYSON FIELD
  - FORT DADE
  - HENDRICKS AAF
  - HENRY BARRACKS
  - LAKE CITY NAAS
  - LEE FIELD
  - MCCOY AFB
  - NAVAL STA SAN JUAN
  - RAMEY AIR FORCE BASE
  - LANDFILL, SOILS & GRNDWT
    - RI/FS
    - RD
    - RA-C
    - LTM
    - PCO
  - SANFORD ARPT
  - TAMPA NAV IND RES SHYD
  - VERO BCH NAVAL AIR STA

FUDS Property

FUDS Property ID: 102PR0879

Date (Month/Year): June 2002

FUDS Property Name: RAMEY AIR FORCE BASE

Description: The former Ramey AFB covered 4,357 acres north of the city of Aguadilla, on the extreme northwestern tip of the island of Puerto Rico. The US government acquired the property between 1939 and 1963, and utilized the site as

FUDS Property: None

Report Option

☐ Calendar Year

☒ Fiscal Year

Note: This option will determine the format of all "Cost Over Time" reports.

Project Costs

☐ Use System Costs

☒ Use User Defined Costs

Cost Date: 2003

Location

State / Country: PUERTO RICO

City: PUERTO RICO AVERAGE

Modifiers

Material: 1.648

Labor: 0.875

Equipment: 0.921

Save Close

# Level 2 (Site) Setup

RACER - Racer SAJ By Dist FY05.mdb

File Reports... Help

Display Option: Name

RACER

- Project for Template Holder
- SAJ
  - AF PLANT NO 74
  - BUSHNELL ARMY AIRFIELD
  - CARLSTROM FIELD
  - DELAND NAV TRG CTR
  - ELLYSON FIELD
  - FORT DADE
  - HENDRICKS AAF
  - HENRY BARRACKS
  - LAKE CITY NAAS
  - LEE FIELD
  - MCCOY AFB
  - NAVAL STA SAN JUAN
  - RAMEY AIR FORCE BASE
  - LANDFILL, SOILS & GRNDWT
  - SANFORD ARPT
  - TAMPA NAV IND RES SHYD
  - VERO BCH NAVAL AIR STA

Project

Project ID: 02

Project Name: LANDFILL, SOILS & GRNDWT

Description: Earth Tech visited district office and conducted data gathering and interviews on 6/18/02 - 6/20/02.  
Remediation Expert: Kelly Rudder

Project Type: HTRW

Phases

Initial Phase Start Date: October 2003

- ☒ Study
- ☒ Remedial Design
- ☐ Interim Action
- ☒ Remedial Action
- ☐ Operations & Maintenance
- ☒ Long Term Monitoring
- ☒ Site Close-out

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# Phase Cost Summary

RACER - Racer SAJ By Dist FY05.mdb

File Reports... Help

Display Option: Name

- RACER
  - Project for Template Holder
  - SAJ
    - AF PLANT NO 74
    - BUSHNELL ARMY AIRFIELD
    - CARLSTROM FIELD
    - DELAND NAV TRG CTR
    - ELLYSON FIELD
    - FORT DADE
    - HENDRICKS AAF
    - HENRY BARRACKS
    - LAKE CITY NAAS
    - LEE FIELD
    - MCCOY AFB
    - NAVAL STA SAN JUAN
    - RAEMEY AIR FORCE BASE
    - 2 LANDFILL, SOILS & GRNDWT
      - 3 RI/FS
      - 3 RD
        - RA-C
          - 1 Excavation
          - 1 Professional Labor Management
          - 1 Residual Waste Management
          - 1 Decontamination Facilities
        - 3 LTM
        - 3 PCO
      - SANFORD ARPT
      - TAMPA NAV IND RES SHYD
      - VERO BCH NAVAL AIR STA

Phase Element - Remedial Action

Name: RA-C

Description: There are 15 total areas of concern at this property. According to Zainul Kidwai, assume each of the 15 areas is 50ft x 50ft, or 2500 sq ft

Media/Waste Type: Soil

Secondary Media/Waste: Groundwater

Contaminant: Fuels

Secondary Contaminant: PCBs

Approach: Ex Situ

Phase Start Date: October 2005

#	Technology	Direct Costs
1	Excavation	\$164,284
1	Professional Labor Management	\$71,388
1	Residual Waste Management	\$217,045
1	Decontamination Facilities	\$53,963

Total Direct Capital Costs: \$506,680

Total Direct O&M Costs:

Total Direct Costs: \$506,680

Rate Groups

Labor: System Labor Rate

Analysis: System Analysis Rate

Recalculate Estimates

Phase Markup %

Technology Markups

Project Costs: User-Defined

Display

☒ Direct Costs

☐ Marked-up Costs

Select Technology

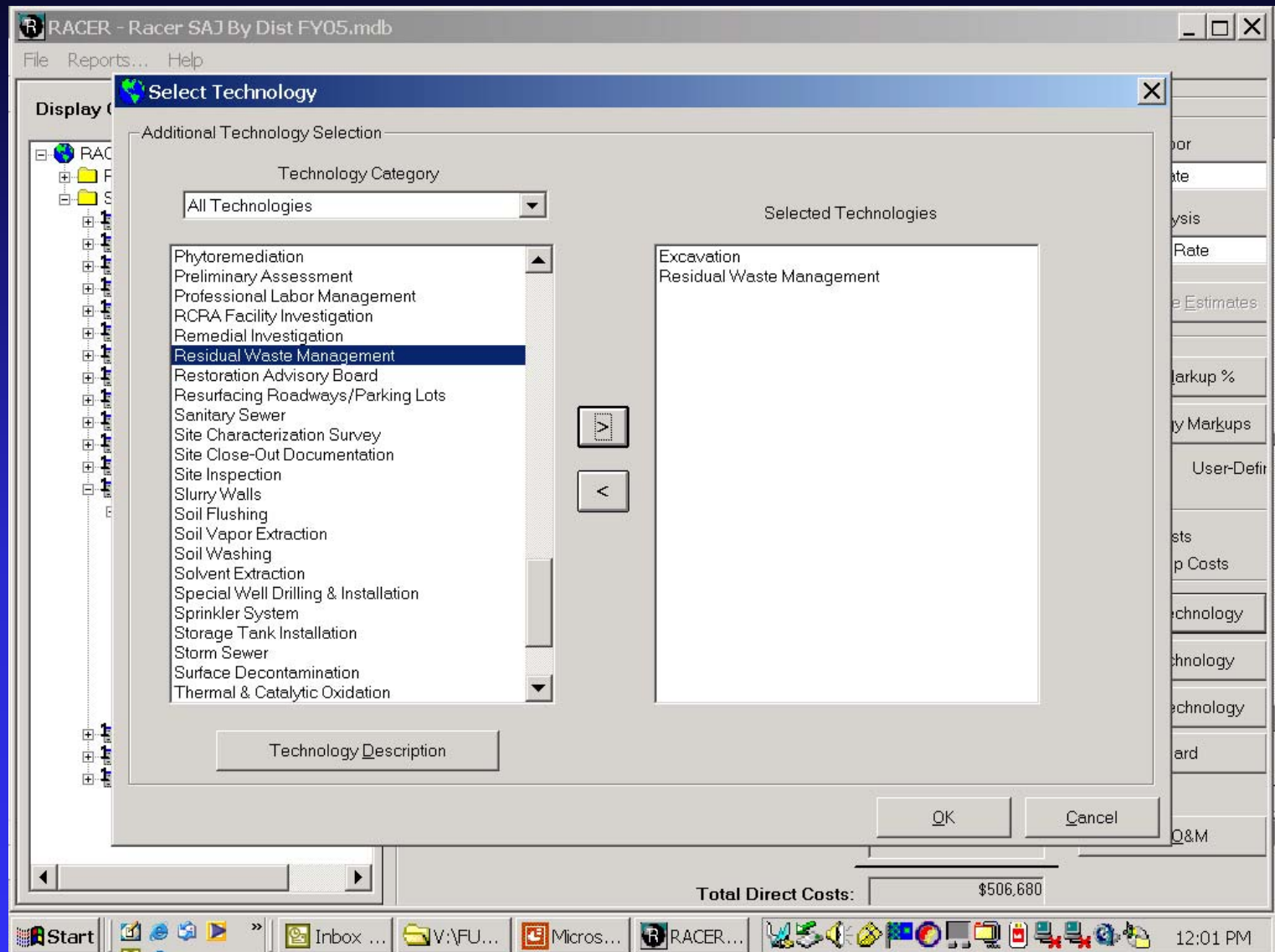
Run Technology

Delete Technology

Wizard

Run Q&M

# Select Technology



# Required Parameters - Excavation

RACER - Racer SAJ By Dist FY05.mdb

File Estimating Preferences Reports... Utilities Help

Display Option: Name

RACER

- Project for Template Holder
- SAJ
  - AF PLANT NO 74
  - BUSHNELL ARMY AIRFIELD
  - CARLSTROM FIELD
  - DELAND NAV TRG CTR
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  - HENRY BARRACKS
  - LAKE CITY NAAS
  - LEE FIELD
  - MCCOY AFB
  - NAVAL STA SAN JUAN
  - RAMEY AIR FORCE BASE
  - 2 LANDFILL, SOILS & GRNDWT
    - 3 RI/FS
    - 3 RD
    - 3 RA-C
      - 1 Excavation
      - 1 Professional Labor Me
      - 1 Residual Waste Mane
      - 1 Decontamination Faci
    - 3 LTM
    - 3 PCO
  - SANFORD ARPT
  - TAMPA NAV IND RES SHYD
  - VERO BCH NAVAL AIR STA

Excavation

System Definition | Excavation | Comments | Reports

Required

Excavation Dimensions

Length 194.0 FT

Width 194.0 FT

Depth 5.0 FT

Soil Type Gravel/Gravel Sand Mixture

Safety Level D

Sidewall Protection

☐ Sheetting

☐ Side Slope (Rise : Run) 1: 0.00

☒ None

☐ Rock Requiring Blasting

☐ Rock Requiring Ripping

% of Excavation 0 %

☐ Excavation Dewatering Required

Duration of Dewatering 0 Days

☐ Drum Removal Required

Number to be Excavated 0

☐ Perform Ground Penetrating Radar

Number of Days 0 Days

Analysis

Number of Confirmatory Soil Samples 10

Soil Analytical Template System Soil-Fuels

Accept Reset Assemblies Save Close

# Secondary Parameters - Excavation

RACER - Racer SAJ By Dist FY05.mdb

File Estimating Preferences Reports... Utilities Help

Display Option: Name

- RACER
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  - SAJ
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      - 3 RD
      - 3 RA-C
        - 1 Excavation
          - 1 Professional Labor Me
          - 1 Residual Waste Mane
          - 1 Decontamination Faci
        - 3 LTM
        - 3 PCO
      - 1 SANFORD ARPT
      - 1 TAMPA NAV IND RES SHYD
      - 1 VERO BCH NAVAL AIR STA

Excavation

System Definition | Excavation | Comments | Reports

Secondary

% of Excavated Material To Be Used as Backfill  %

Source of Additional Fill

Existing Cover

Replacement Cover

Accept Reset Assemblies Save Close

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# Excavation - Cost Summary

RACER - Racer SAJ By Dist FY05.mdb

File Estimating Preferences Reports... Utilities Help

Assembly Qty / \$

Sort Assemblies By:  
☒ Assembly ☐ Description

**Assembly Quantities and Costs**

Assembly	Description	Qty	UM	Material	Labor	Equipment	Extended Cost
▶ 17030278	3 CY, Crawler-mounted, Hydraulic	6969.63	CY	0.00	0.85	1.15	13,887.68
17030418	Delivered & Dumped, Backfill with	696.96	BCY	39.61	0.55	0.73	28,494.30
17030423	Unclassified Fill, 6" Lifts, Off-Site,	8722.04	CY	8.92	1.03	1.97	103,974.60
33020401	Disposable Materials per Sample	10	EA	12.64	0.00	0.00	126.38
33021102	Soil Moisture Content ASTM D2216	10	EA	37.07	0.00	0.00	370.71
33021722	Polynuclear Aromatic	10	EA	190.47	0.00	0.00	1,904.72
33021732	Total Petroleum Hydrocarbons (SW	10	EA	104.62	0.00	0.00	1,046.24
33021776	BTEX/MTBE/TVPH (EPA	10	EA	120.94	0.00	0.00	1,209.41
33080584	Plastic Laminate Waste Pile Cover	64996.61	SF	0.18	0.02	0.00	12,986.32
33170803	Decontaminate Heavy Equipment	1	EA	0.00	283.93	0.00	283.93

Delete Assemblies Add Assemblies View Line Items Marked-up Cost Reset Costs Close

Total: \$164,284.28

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# Markups Template

**Markup Templates**

Markup Template: System Defaults

Markups Example

New Copy Delete

Total Direct Costs	Prime				Sub				
	Pro. Labor	Craft Labor	Mat.	Equip.	Pro. Labor	Craft Labor	Mat.	Equip.	
< 10,000	25.0	25.0	17.0	40.0	25.0	25.0	17.0	40.0	
10,001 to 25,000	15.0	20.0	12.0	30.0	15.0	20.0	12.0	30.0	
25,001 to 50,000	10.0	17.5	10.0	20.0	10.0	17.5	10.0	20.0	
50,001 to 100,000	7.5	15.0	8.0	15.0	7.5	15.0	8.0	15.0	
100,001 to 250,000	5.0	12.0	6.5	10.0	5.0	12.0	6.5	10.0	
250,001 to 500,000	5.0	10.0	5.0	8.0	5.0	10.0	5.0	8.0	
> 500,000	5.0	8.0	5.0	6.0	5.0	8.0	5.0	6.0	
Overhead	160.0	30.0	8.0	8.0	160.0	30.0	8.0	8.0	
General Conditions									
Prime Markup on Sub	3.5	Risk (Contingency)		0.0	Sub Profit				8.5
Prime Profit	8.5	Owner Cost		5.0					

Help Cancel Save Close

# Cost Over Time Report

Microsoft Excel - Costs Over Time

Next Previous Zoom Print... Setup... Margins Page Break Preview Close Help

ProjectCostOverTime Report (rth Markup)

Folder: SAJ		Location: PUERTO RICO AVERAGE, PUERTO RICO											
FUDS Property Name: RAMEY AIR FORCE BASE		Report Option: Fiscal											
FUDS Property ID: 02 PRO 573		Initial Phase Bement Start Date: 10/12/003											
Project Name: LANDFILL, SOILS & GRNDWTR													
Project Type: HTRA													
Project ID: 02													
Phase Bement	Phase Bement Name	Fiscal Year 1 2004	Fiscal Year 2 2005	Fiscal Year 3 2006	Fiscal Year 4 2007	Fiscal Year 5 2008	Fiscal Year 6 2009	Fiscal Year 7 2010	Fiscal Year 8 2011	Fiscal Year 9 2012	Row Total	Phase Bement	Phase Bement
Study 1	RVS	\$632,689									\$632,689	Study 1	RVS
Remedial Design	RD		\$18,132								\$18,132	Remedial Design	RD
Remedial Action	RAC(Capitol)			\$592,033							\$592,033	Remedial Action	RAC(Capitol)
Remedial Action	RAC(O&M)			\$4,983							\$4,983	Remedial Action	RAC(O&M)
Long Term Monitoring	LTM				\$414,738	\$200,861	\$200,861	\$200,861	\$200,861		\$1,216,182	Long Term Monitoring	LTM
Site Close-out	PCO									\$5,397	\$5,397	Site Close-out	PCO
Total		\$632,689	\$18,132	\$597,016	\$414,738	\$200,861	\$200,861	\$200,861	\$200,861	\$5,397	\$2,669,416	Total	

Cost Over Time Report  
Cost Type: Landfill  
Date: 10/12/003  
Time: 12:30 PM

This report is for informational purposes only.

Page 1 of 1

Preview: Page 1 of 1

NUM

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# Future RACER Development

- USACE Role in future RACER Development
  - ◆ Identify new technologies for model development
  - ◆ Continue to evaluate models to ensure technically correct
  - ◆ RACER 2004 scheduled to be released Fall 2003



*RACER 2003*  
*How It Is Used by USACE For*  
*Estimating Environmental*  
*Remediation Projects*

- Your Questions?